DOCKET FILE COPY ORIGINAL

Sprint

Jay C. Keithley
Vice President

Law & External Affairs
1850 M Street, NW, Suite 1100
Washington, DC 20036
Voice 202 828 7453
Fax 202 296 3469
jay.c.keithley@mail.sprint.com

EX PARTE OR LATE FILED

EX PARTE

May 19, 1998

RECEIVED

MAY 19 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
1919 M Street, N.W. Room 222
Washington, D.C. 20554

RE: In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45 and Forward-Looking Mechanism for Non-Rural LECs, CC Docket No. 97-160

Dear Ms. Salas:

The attached was today provided to the Common Carrier Bureau staff listed below in respopnse to the HAI Model analysis of Jeff Prisby dated May 13, 1998.

Sprint requests that this information be made a part of the record in this matter. Four copies of this letter, in accordance with Section 1.1206(a)(1), are provided for this purpose. If you have any questions, please feel free to call.

Sincerely,

Jay C Keithley

Jay C. Keithley

Attachment

cc: Brad Wimmer
Chuck Keller
Don Stockdale
Craig Brown
Richard Smith
Brian Clopton
Natalie Wales
Jim Schlichting
Bob Loube
Lisa Gelb

No. of Copies rec'd 0+3
List A B C D E

Sprint Response to Analysis of Jeffrey Prisbrey

In his document dated May 13, 1998, Jeffrey Prisbrey presents evidence regarding measures of customer dispersion similar to those modeled in the Hatfield Model 5.0a (a.k.a. HAI Model). Specifically, as stated in his document, Mr. Prisbrey provides a "measure of dispersion of customer locations both before and after an algorithm similar to the HAI algorithm is applied to create rectangular serving areas."

The spreadsheet that accompanies Mr. Prisbrey's document presents the following information and conclusion: **In general, customer dispersion is altered, often dramatically, when "an algorithm similar to the HAI algorithm" is applied to customer locations.** The bias of this impact is uniformly negative.

The result of this bias produced by the HAI Model (and its preprocessing) is to understate customer dispersion and, all else held constant, understate the cost of providing service to customers by underbuilding the network, specifically with regard to distribution plant. This finding is consistent with previous findings that Sprint has presented to the FCC.

Specifically, Sprint has shown numerous cases where the amount of distribution cable built by the HAI Model for individual clusters falls far short of the amount of cable actually required to connect customer locations in those clusters. One driving factor behind this underbuilding is the distortion of customer location that occurs in the model's preprocessing (the exact occurrence described by Mr. Prisbrey). Further distortion takes place in the HAI Distribution Module itself. The result of this underbuilding is that the Hatfield Model 5.0a does not build a functioning telephone network in many of the areas that are of greatest concern for universal service.

Recently, Sprint was provided an opportunity to examine additional data for the state of Nevada to determine the extent of this underbuilding problem. As stated in the Prisbrey document, the HAI Sponsors have claimed that this situation is rare. Mr. Prisbrey's analysis strongly suggests otherwise, and provides evidence that the problem is systematic rather than random.

On the following pages, Sprint presents summary evidence that provides further support for Mr. Prisbrey's analysis. The following pages contain no protected or proprietary material.

Mr. Prisbrey found, on average, that the *number of customer locations per cluster* was related to the amount of distortion the HAI produced. For example, distortion was larger (in percentage terms) for smaller clusters (N=5) than for larger clusters (N=40). This is shown below.

Number of Customer Locations per Cluster	Average Distortion from Star Network	Average Distortion from Minimum Spanning Tree
N=5	71.2%	73.2%
N=10	47.6%	55.5%
N=15	36.0%	44.0%
N=25	15.4%	41.5%
N=40	14.8%	32.8%

These are consistent with the results Sprint found in its own analysis.

The table below lists the amount of underbuilding (as a result of this customer location distortion) that the Hatfield Model exhibited for Nevada with regard to 2 measures: the minimum spanning tree for the cluster, and the diagonal distance of the cluster's minimum bounding rectangle.

(For example, assume the minimum spanning tree of a cluster is 5000 feet, and the diagonal of that cluster's minimum bounding rectangle is 3000 feet. If the HAI Model builds a total of 1000 feet of distribution for that cluster, the first column below would show an underbuild of 300% (3000/1000) and the second column would show an underbuild of 500% (5000/1000).

Number of Customer Locations per Cluster (Main Clusters Only)	Average Underbuild from Diagonal of Minimum Bounding Rectangle	Average Underbuild from Minimum Spanning Tree for Cluster
N=5	1,674%	1,911%
N=10	406%	511%
N=15	255%	358%
N=20	121%	225%
N=25-30	61%	141%

[It should be noted that the vast majority of the smallest clusters (N=5 or N=10) all fall within the two lowest density zones for the state of Nevada and these two density zones account for over 90% of the universal service support for the state. Therefore, this distortion and underbuilding is greatest in those specific areas that are of greatest concern for USF purposes.]

As the table shows, the relationship between size of the cluster (N) and location distortion is exhibited in the relationship between size of the cluster and amount of underbuilding. It should also be noted that the percentages are dramatically higher in the table based on actual Nevada data. The reason for this is straightforward, and is outlined below:

As stated in Sprint's ex parte filing of April 17, 1998, the HAI model underbuilds as a result of three separate effects

1. The conversion of the original polygon to a reduced rectangle (this is the only portion captured by Prisbrey's analysis), which reduces customer dispersion
2. The practice of not building to the outside of the perimeter lots, which reduces customer dispersion even further, and
3. The assumption that lots are shaped and situated a specific way, and that all customers live within 150 feet of the front of the lot.

The combined impact of these three effects results in the dramatic underbuilding that Sprint has documented since April. Furthermore, evidence of this underbuilding has appeared in the rural areas of every state we have investigated. This lends further support for Prisbrey's conclusion that this is not a random or rare occurrence, but a systematic effect.

The claim regarding the frequency of these occurrences is well supported in Prisbrey's document. The figures shown in the table below were obtained using the spreadsheet provided with that document.

Number of Clusters in Prisbrey analysis.	Number of Clusters where Hatfield Dispersion was LESS than Original Dispersion as measured by Star Network	Number of Clusters where Hatfield Dispersion was LESS than Original Dispersion as measured by Minimum Spanning Tree.
2440	2399 (98%)	2400 (100%)

This fact is also supported by Sprint's evaluation of the actual data from Nevada.

Number of Main Clusters having 200 Lines or Less (maximum N in Prisbrey analysis)	Number of these Clusters where Hatfield Distribution was LESS than the distance of the **diagonal** of the cluster's minimum bounding rectangle.	Number of these Clusters where Hatfield Distribution was LESS than the distance of the cluster's **minimum spanning tree**.
586	449 (76%)	566 (96%)

The distortion cited by Mr. Prisbrey and its impact on the network and costs that the HAI produces is not rare, it is not random, and it is not *de minimus*.

Based on this evidence and other evidence presented to date, the following is clear: **The Hatfield (or HAI) Model 5.0a in its current form cannot be used as a costing methodology for calculating explicit USF.**

Sprint respectfully submits the following Model Recommendation:

Sprint believes that the BCPM produces a substantially more accurate estimate of distribution plant distances and associated costs that the HAI Model. However, Sprint also recognizes that an even more accurate estimate of distribution plant and costs, especially in less populated rural areas, could be produced using actual (i.e. geocoded) customer locations. Sprint also agrees with the Commission staff's determination to obtain that customer location data. However, *the key to this additional accuracy lies in the model (any model) actually* ***using*** *the customer location: building plant to actual locations, and maintaining relative distances between locations.*

In order to finalize a forward looking cost model by August 8th, Sprint urges the Commission to take the following steps:

1. The Commission needs to resolve the outstanding network design and technical parameter issue. These include, for example, the maximum copper loop length (the BCPM Sponsors recommend use of a 12,000-foot limit, while the HAI Sponsors recommend a limit of 18,000 feet), and the method for serving very sparsely situated customers (the BCPM serves these customers through DLCs, while the HAI uses T1 repeaters and remote terminals.) These issues are well articulated in the various comments and ex parte submissions of interested parties, and are ripe for Commission decision. The Commission should note the possibility that this resolution might include incorporating portions of each model into the Commission's final model (see point 2 immediately below).
2. Most importantly, the Commission needs to take "ownership" of the modeling effort. Based on the models submitted for its consideration, and the resolution of the network design and technical parameter issue noted above, the Commission should take responsibility for finalizing its cost model. Sprint believes it is no longer productive to continue the development of competing, privately funded cost models. Only by taking ownership of the model development process, and using the work that has already been done by the model sponsors, can the Commission hope to meet its August 8th deadline.
3. The Commission should develop a plan and timeline for obtaining geocoded data from all LECs. Sprint believes it would be reasonable to require that such data be produced by mid-2000, and incorporated into the model for cost estimation purposes by January, 2001.